

PRESENTATION FRETWORK DESIGN WITH THIS NUMBER.

# Hobbies

• A. Weekly. Journal. •

For Amateurs of Both Sexes.

No. 4. VOL. I.

NOVEMBER 9, 1895.

ONE PENNY.

Bazaar Decoration.

Stamp Collecting Week by Week.

Fretworking in Wood.

The Magic Lantern and How to Prepare the Light.

Venetian Ribbon or Bent Iron Work.

Cycling and Athletics.

Electrical Science,—The Induction Coil.

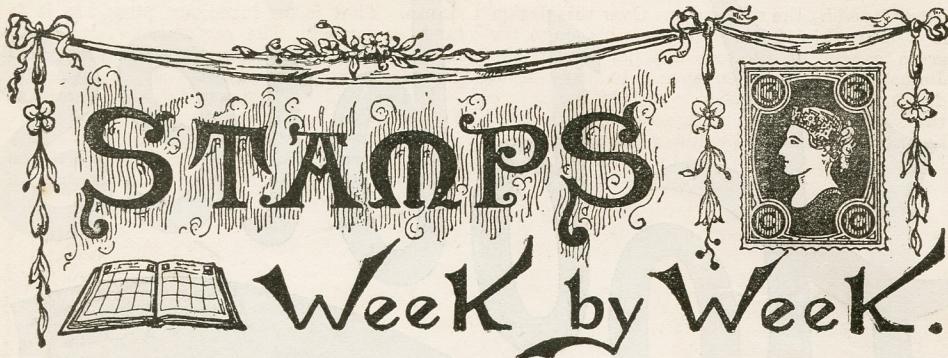
How to Make a Folding Bookshelf.

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# STAMPS

Week by Week.

*A Philatelic Causerie by PERCY C. BISHOP,*

*Joint Editor of the "STAMP COLLECTORS' FORTNIGHTLY," Ex-Editor of "THE PHILATELIC JOURNAL" and "PHILATELIC REVIEW OF REVIEWS;" Founding Member of the LONDON PHILATELIC CLUB.*



PHILATELY gains in popularity day by day. New Societies of stamp collectors are constantly being formed. The Nottingham and District Society is the latest. His Honour Judge Masterman, a painstaking and enthusiastic Philatelist, occupies the presidential chair; Mr. H. Harold Brown is the Hon. Secretary, and among the members are Messrs. Stanley Birkin, E. G. Simpson, J. G. Spendlove, H. Fothergill, and T. B. Forman. The Society will be especially active in the study of the stamps of Great Britain, which, as I have already explained, are in great demand just now. The Philatelic Societies of this country, excluding mere exchange clubs, are nearly thirty in number. The most active are the London, Manchester, Birmingham, Plymouth, Leeds, and Oxford Societies; but a number of younger organisations are coming on most promisingly. A Philatelic Society of a unique character is the City of London Philatelic Club, with headquarters at 121, Cheapside, London, the object of this Society being to promote social as well as Philatelic intercourse.

A list of all the Stamp Societies and Clubs in the United Kingdom would take up an unconscionable amount of space. Any reader of *Hobbies* who is desirous of joining a Society in his own town or district had better drop me a line and I shall be pleased to help him.

At the moment of going to press news reaches me of the formation of yet another Society, this time at Warrington, with Mr. Herbert Woods as Hon. Secretary.

—:o:—

It has been suggested time and again that the example set by ex-Postmaster General Wanamaker, of the United States, in issuing a set of commemorative postage stamps bearing a series of historic pictures should be followed by this country. "H. J. S." in a recent letter to the daily papers, repeated the suggestion, and suggested a number of tableaux, from the landing of Julius Caesar to the opening of the London School Board, as suitable for illustration on a series of British commemorative

stamps. To this Mrs. Scott Stokes, a lady journalist who makes philately her hobby, retorts that the idea is altogether impracticable. "It is true (writes Mrs. Stokes) that the expense was covered in the case of the U. S. A. designs by the enormous demand on the part of stamp collectors themselves for the novelty. But even collectors are getting tired of having their pockets squeezed by every Government that wants to fill its money-box or to amuse itself with pretty fancies, and the very dealers are standing out strongly against issues 'made for collectors,' foreseeing that the supply before long would swamp the demand and spoil the market."

—:o:—

In addition to the rubbishy New South Wales "O.S." stamps, postmarked to order, which I mentioned last week, the Society for the Suppression of Speculative Stamps warns us against the following:—

TRANSVAAL.—A Commemorative Stamp of the value of 1d., rose (oblong), fully described last week.

PERU.—A set of Commemorative Stamps, described last week.

AMOY.—More Chinese Locals.

Furthermore, it is pointed out that "commemorative" or "jubilee" issues are contemplated in Belgium (in connection with the Liege Fêtes), in Greece (Olympian Games), in Hungary (Millennium stamps), and in Sweden; and though it is impossible to condemn these stamps as being absolutely "unnecessary," yet collectors and dealers are advised to give them a wide berth.

#### NEW ISSUES OF STAMPS.

\* \* Items for this department will be gratefully received from any Philatelic readers who happen to receive early information of new issues, or of impending changes in the postal arrangements of any country.

BRITISH CENTRAL AFRICA.—I am now able to more minutely describe the newly issued stamps for this territory, briefly mentioned last week. In the centre two negroes bearing in their hands instruments of industry support a shield on which appears what is probably the arms of Britain, though the design is too small to admit of this being very clearly

determined by the naked eye. Over this design is a tree which bears some resemblance to the great cedars of Mount Milanje, which Mr. Johnston has done so much to save from destruction. In the lower part of the stamp the value is inserted in figures in each corner, and on the centre of the lower part is a scroll bearing the legend, "Light in darkness."

**BULGARIA.**—The illustration here given shows the shape and design of the new Bulgarian unpaid letter stamp of the value of 5 stotinki. It is on pelure paper, and perforated  $11\frac{1}{2}$ .

**COREA.** now that she is again independent, or comparatively so, hankers after a set of



postage stamps of her own. Accordingly a set of four labels have been issued in the style of the annexed illustration. The values are 5, 10, 25, and 50 poon, or poons, whatever they may be. I look on this issue with much distrust, and should advise all my readers to eschew such stamps as these.

**SIAM** furnishes a new issue for which it is likewise impossible to say much. It is an "Officially Sealed" stamp which has rather

the appearance of a luggage label. Fortunately there is only one of these to the set, and that one is imperforate, and printed in a deep rose on white paper.



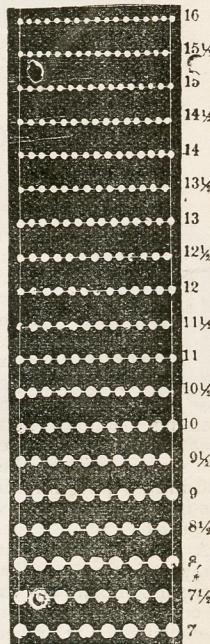
### HINTS TO BEGINNERS.

#### PERFORATIONS.

Upon the perforation of a postage stamp very much depends. A variation of a tenth part of a centimetre in the "size" of the perforation often means a great difference in the Philatelic value. There are various methods of perforating postage stamps, but the most general is that which we call common or machine perforation. Holes are bored in the sheets of stamps by a machine composed of rows of sharp needle points. The ordinary penny postage stamps now in use in this country are a familiar example of "machine perforation." It is with this class of perforation that I wish first to deal. Take up a stamp dealer's catalogue, or a work on the stamps of any country, and you will see stamps described as "perf.  $12\frac{1}{2}$ ," "perf. 14," "perf. 16." To the uninitiated this is very mysterious indeed. The "perf." of course means "perforation"—that is simple, but what do the figures indicate? Many schoolboys and very young collectors run away with the notion that they show the number of "jags" in the perforation of one side of the

stamp. That is an ingenious guess, but it is far from correct. The perforations are calculated in this way. A perforation gauge was devised some years ago by Dr. Legrand, a venerable and well-known Parisian collector. This gauge, which is now adopted by the whole Philatelic world, calculates the perforation of a machine-perforated stamp on the basis of the number of holes or indentations that occur in the space of two centimetres.

Herewith I am able to give my readers a rough idea of a perforation gauge, but to ensure strict accuracy I should recommend them to order the "Ideal" gauge which is published at 6d. by Mr. William Brown, St. Thomas' Square, Salisbury. But the rough design I publish here is quite sufficient for the purposes of illustration. If the reader will take some stamp that is machine perforated, and move it up or down this gauge until he finds the line of dots which exactly dovetail into the perforation of the stamps, the number placed against that line of dots will then give him the perforation of the stamp. Thus it will be found that an English  $\frac{1}{2}$ d. or 1d. stamp of the current issue is "perf. 14."



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#### CHAP. IV.—COMPRESSED GASES FOR LANTERN ILLUMINATION.



We have dealt with the manufacture of oxygen and its storage in bulk in what are known as gas bags. These have to a very great extent been superseded by cylinders, in which the gas, either oxygen or hydrogen, is charged by a special compressing machine. It may be here mentioned that the man with the hobby may make his own oxygen gas, but he will find it very costly, and in fact quite impracticable to compress the gas into the cylinders which are now universally used.

A few words on the general principle of compressing gases will suffice, and as the Brui's Oxygen Company are the largest manufacturers of compressed gases, and were the pioneers of the business, a reference to the "Handbook on the Use of Compressed Oxygen," by Mr. Kenneth S. Murray, the Company's engineer, will be pardoned.

Cylinders are made to contain varying and convenient quantities of gas at a pressure of 120 atmospheres; this is the standard of pressure at present employed. These cylinders are made of all lengths, the thickness varying with the diameter and type of cylinder, thus:—

|   |                           |
|---|---------------------------|
| 4-inch seamless type,                         | $\frac{5}{32}$ inch thick |
| $5\frac{1}{2}$ " " " " $\frac{3}{2}$ "        | "                         |
| $5\frac{1}{2}$ " lap-welded " $\frac{1}{4}$ " | "                         |
| 7 " seamless " $\frac{9}{32}$ "               | "                         |

The quality of metal varies but little, and ductility is practically ensured by annealing and by employing only a mild quality of steel.

With regard to the much talked oxidation of the metal on the inner side of an oxygen cylinder, this is very slight, and before such action can take place Carbonic Acid must be present in the gas. In the Brui process no Carbonic Acid is made, and to this is due the fact that oxidation of the cylinders is almost *nil*. The question of safety of a cylinder in transit is often raised, and some very absurd statements have been made from time to time as to the effect that heat has upon the pressure of gas inside the cylinder. Mr. Murray tells us that—"Oxygen is a gas subject to the law that pressure increases uniformly with the temperature when the volume remains the same." It is an easy matter, therefore, to calculate the

actual increase or reduction of pressure for every measurable degree of temperature. The following represents the pressure at a few different temperatures:—

|                |     |        |             |
|----------------|-----|--------|-------------|
| 60° Fahrenheit | ... | 120.00 | atmospheres |
| 70° "          | ... | 122.33 | "           |
| 80° "          | ... | 124.64 | "           |
| 90° "          | ... | 126.86 | "           |
| 100° "         | ... | 129.26 | "           |
| 150° "         | ... | 140.85 | "           |
| 212° "         | ... | 155.21 | "           |

Extremes in temperature should be avoided, but from the above table it may be reasonably concluded that no atmospheric or sun heat could increase the pressure of gas in a cylinder to such an extent as would render it dangerous for use.

All cylinders, before being filled, are now annealed and tested, and afterwards specially stamped, and the particulars of the number, name, and address of owner, or user, is registered in a book so that every cylinder charged can be traced.

The importance of these precautions are now fully realised, and the action of the Brui Company, in enforcing the testing of cylinders, has done much to reduce the very unnecessary alarm and suspicion of the public as to the dangers of "them gas bottles."

It is well for those who can afford it to buy their own cylinders, one for oxygen and the other for hydrogen; this latter can often be dispensed with. In using the "blow-through" jet, which we shall presently describe, the house or common coal gas can be used instead of compressed hydrogen; but with the mixed jet, which gives by much the better illumination, the second or hydrogen gas is necessary. The want of pressure, and the irregularity of supply with house gas militating very much against a good light, and its use, if not exactly dangerous, is to say the least of it unsatisfactory and undesirable.

The size of cylinders must be a matter for each one to decide for himself, but the quantity used in the two kinds of jets may be calculated as follows:—

|                          |                |                   |
|--------------------------|----------------|-------------------|
| Blow-through Jet, Oxygen | 4              | cub. ft. per hour |
| " " " " Hydrogen         | $8\frac{1}{2}$ | " "               |
| " " " " Coal gas         | $4\frac{1}{2}$ | " "               |
| Mixed " " " " Oxygen     | $4\frac{1}{2}$ | " "               |
| " " " " Hydrogen         | $9\frac{1}{2}$ | " "               |
| " " " " Coal gas         | 5              | " "               |

From the foregoing it will be seen that if a 10-feet oxygen cylinder is used, the hydrogen cylinder should certainly contain 15 feet.

Before leaving the cylinders we would call attention to the rules and restrictions laid down by the Railway Companies. Nearly all the Companies *refuse* to carry cylinders of compressed gases by passenger train, whether as personal luggage or otherwise. All cylinders have to be packed, and the Brui Company and other suppliers of compressed gases have designed most ingenious and effective means of properly packing and securing the cylinders for transit. In the London and Suburban district, covered by Messrs. Carter, Patterson, & Co., there is not much difficulty in having the cylinders delivered, but otherwise the transit must be by goods train, and in ordering this must be remembered, so that sufficient time is given in order to prevent disappointment. A Lantern Slide Exhibition without gas is a fearful fiasco. If the Slides happen not to turn up a "scratch collection" can generally be found, but *sans le gaz* the demonstrator may be forgiven if he exclaims in the refrain of Chevalier's popular song,—"E dunno were 'e are."

In using the cylinders it is well to arrange that they should stand upright and side by side.

By-the-bye, we should have mentioned that all oxygen cylinders are painted *black*, and hydrogen cylinders *red*. The screws of the former are normal or ordinary, but in the latter they are left-handed. This is done so that the fittings of the one cannot be used for the other. Some very capital stands are made to set the cylinders in, but the "Hobbyist" will soon discover a means of fixing his cylinders upright. In practice we often lash one to each of the legs of the table on which the Lantern is rigged up.

All cylinders are provided with a valve or tap; on receiving this it is of course closed. Until quite recently a key with a T was used for opening and closing this valve, but thanks, we think to Messrs. Butcher & Sons, a lever key has been brought out, which is much better in its action. With the T shaped key difficulty was often experienced in opening the valve, and it too often opened with a jerk. With the newer form of key the valve may be opened very gradually. This valve should never be closed *dead*, as it only tends to wear the faces of valve and plug. It will be readily understood that gas at the 120 atmospheres gives a great pressure, so that great care must be taken in turning the valve on and off. Let us just caution our readers on no account to use oil or grease, as no lubricant is needed. The valves are perfectly gas-tight when sent out. In shutting off after use see that the valve is closed. To test this fill the nozzle above the valve into which the regulator is screwed with a little soapy water; if there is the slightest leakage bubbles will rise on the surface. No strain should be put on the valve. When closing turn the key gently and the plug will "go home."

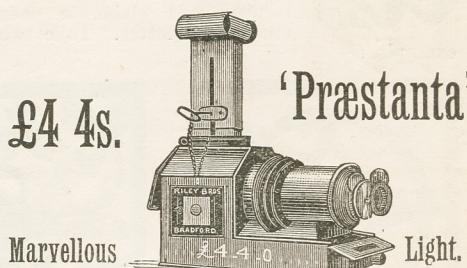
#### THE REGULATOR AND FITTINGS.

Before the cylinder can be used or gas supplied to the jet in the Lantern, first a winged sliding socket is screwed into the top of the cylinder valve, and into this is screwed the regulator. This has a cone shaped end which seats into the top of cylinder valve, and the winged socket holds it firmly in position. There are

many forms of Regulators, but one which is in universal use is Beard's. The object of the regulator is to reduce the pressure of the gas issuing from the cylinder to a pressure at which it can be controlled for the jet supply. By the use of this regulator the pressure of gas in the cylinder is maintained until it is emptied, but the gas supplied to the jet is lowered in pressure in order to facilitate its consumption. To make the cylinder arrangements complete, and where expense has not to be considered, a pressure gauge may be attached to each valve. These are known as Bourbon gauges, and have a pointer which marks on a dial the number of feet contained in the cylinder. This is, of course, very satisfactory, but the operator will soon be able to judge of the quantity used by the time that the Lantern has been in use. At all events, a liberal allowance upon the figures in the table we have given will be quite sufficient for ordinary workers.

Next week we shall describe the use of the limelight in the Lantern.

(To be continued.)

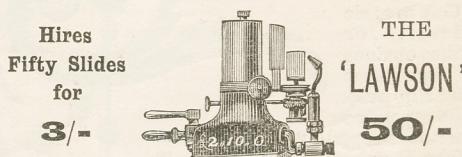


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## CHAP. IV.—DESIGNS,—SIMPLE AND DIFFICULT.



examples:—

WITH Fretwork Patterns in general, much confusion often exists as to what is simple and what is difficult, the common error being that open Designs with comparatively little cutting are classed among the former, and elaborate ones among the latter. Take two

As an example of what is really difficult in Fretwork, the following sketch (Fig. 12), which might serve as a piece of Overlay Ornament, is given. This little Design perhaps looks simple, but it cannot easily be cut to satisfaction. Spiral curves are quite as puzzling to cut as they are to draw, and what adds to the difficulty here is that there are two *symmetrical* sides to the Ornament, and both must



FIG. 9.



FIG. 10.

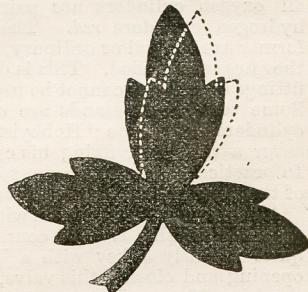


FIG. 11.

Now it may be that Fig. 9 can be cut in a shorter time, but the work requires much greater care, and the slightest mistake will have a marring effect. Floral and Foliated Ornaments, however intricate, are much more simple to cut than those of a Classic or Geometric form, for the obvious reason that a slip may be rectified

without spoiling the Pattern. The Saw blade may happen to wander from the line in cutting a leaf such as Fig. 11, but with judgment and care the error can be remedied (see dotted lines) without materially altering the Design, and without losing any of its character. But with a straight line, or a circle, or with ornamental curves, no such liberty can be taken; the line of the Diagram must never be left, or the Article inevitably suffers.

be sawn exactly alike if it is desired that the work should look well. A slip may be made on one side and effectively remedied; but how about the other? Is the slip to be repeated? Or is the Diagram to be adhered to, and thus the two sides left unequal?

The chain, too, with its thin stem and circular drops will

give considerable trouble, and demands much time and care. Other forms of difficult work can be found amongst Chippendale Frets, such as Fig. 13. This Diagram would entail not only accurate revision in drawing, but the most laborious

care in cutting out. Every corner would have to be taken with extreme sharpness, as it is apparent that the smallest error would reveal itself. So when the reader hunts around for something simple and easy to saw, let him look

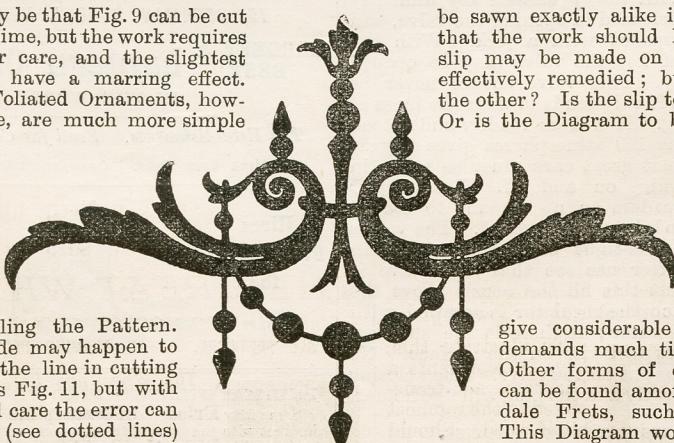


FIG. 12.



FIG. 13.

as much to the style of the Ornament as to the intricacy of the Design.

Severe Patterns are decidedly the most difficult to cut, and when they are merely composed of geometric forms, the result—so far as appearance is concerned—hardly repays the labour. Still, a wholesale condemnation must not be passed on what is severe. Chippendale, Elizabethan, Dutch, and other Frets may be stiff and severe in general form, but many of them are singularly beautiful; and a simple Design, if it be in some genuine style, is often much more admired than intricate arrangements of unnatural leaves and flowers. A small Chippendale Bracket will be allowed a place in the drawing-room long after the elaborate goodness-knows-what Etagère has been dismissed to a lumber-room.

## HINTS.

In cutting out any Pattern, whether easy or difficult, a point which is often overlooked may perhaps be mentioned, namely, the direction the Saw should take. In sawing this small piece (Fig. 14) it is seen that the blade can travel either in the direction indicated by arrow A, or in that indicated by arrow B; in short, either to right or left. The matter is not so trivial as it may appear at first sight.

True, there is no intention here to write enthusiastically in favour of taking one particular direction, although a humble vote might be recorded in favour of arrow A, as in the case of machine sawing, the wood is usually held firmly with the right hand, and guided with the left. As this, however, may be regulated by the position of the light, the point is not worth arguing. What may be suggested is, that throughout the cutting of an article the Saw should always go in the same direction. This rule ought to be strictly kept where several pieces are being cut at once; as if the blade did not happen to be perfectly vertical, the fault would be noticeable on the lowest piece.

To illustrate this, Fig. 15 represents a Diagram as transferred to the topmost bit of wood. Should the Saw blade be slightly off the right angle, but were it always guided in one direction, the lowest piece would turn out either as Fig. 16 or Fig. 17,

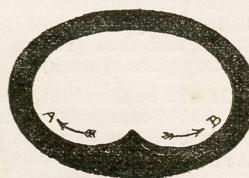


FIG. 14.



FIG. 15.

according to whether the Saw travelled in the way of our old friend arrow A, or in that of his rival, arrow B. In each case the leaf would be at fault, but still proportionate, and not by any means an utter failure. If, however, arrows A and B were patron-

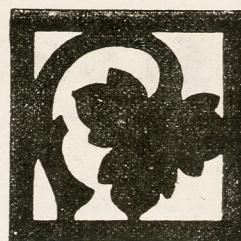


FIG. 16.

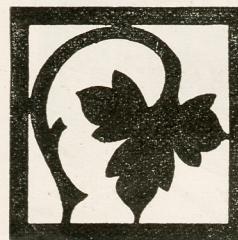


FIG. 17.

ised alternately, the natural result would be a combination of Figs. 16 and 17. Consequently some such unpleasant effect as is seen in Fig. 18 may be avoided by following out the suggested rule. Of course, as neither Figs. 16 or 17 can reasonably

be termed satisfactory, the vertical\* accuracy of the Saw blade should be looked to.

It should be understood that the sketches which are shewn from time to time in these articles are not taken from any Fretwork Patterns, but are merely given to illustrate and make clear the different matters treated. Thus figures 9, 10, 12, and 13 are not intended to be full size, but are reduced to about one-third, or one-fourth. The other figures are drawn somewhat larger in proportion; in fact they may be regarded as full size.

(To be continued.)

\* NOTE.—In speaking of the saw being *vertical*, what is actually meant is that the Tilting Table of the Fret Machine should be *horizontal*. The common phrase is here adopted for convenience sake, and the term is applicable when the Hand Saw is referred to.

## THE ATTRACTION OF THE SEASON.

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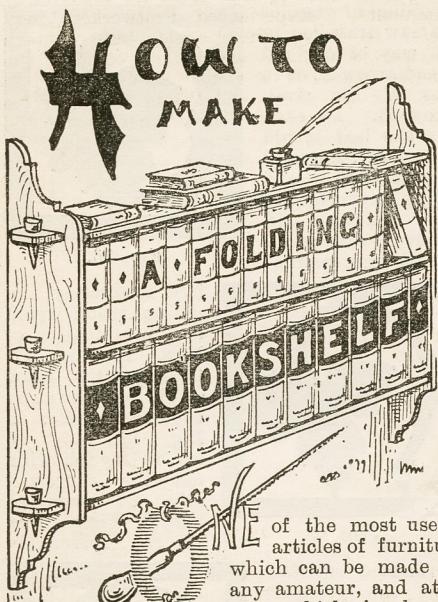
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of the most useful articles of furniture which can be made by any amateur, and at a cost which is hardly worth consideration, is a small Folding Bookshelf. The above sketch indicates the general idea of a simple one, and a few hints and suggestions will enable any lady or gentleman who possesses a hammer, saw, and a little common sense to make it.

Firstly, as to woods, almost any material may be used, and the choice can safely be left to the worker. Of the commoner woods, Pine, Ash, Birch, and Elm will be found the most suitable, and of the better qualities, Oak, Mahogany, and Walnut might be used.

For a small two-space Book Rack as shewn, procure five pieces of wood about 30 inches long, 6 inches wide, and  $\frac{5}{8}$  inch thick. It will save the average amateur a considerable amount of trouble if he buys the wood ready planed; but to any one who knows how to handle a plane, it will certainly be found cheaper to purchase the wood in plank form. Two boards for the Sides should be cut as indicated in Fig. 1. The Shelf spaces will be 9 inches and  $7\frac{1}{2}$  inches respectively, and the other sizes are marked on the illustration. The shaped pieces at each end may easily be cut with a Keyhole Saw, or with an ordinary Fretsaw if a large blade is used. To those who may not happen to have these tools at hand, and who must therefore try something more simple, any of the methods shewn in Fig. 2 are suggested.

Should it be desired to have the Rack standing on a mantelshelf or on any article of furniture, the lower ends of the sides might be made a few inches longer so that

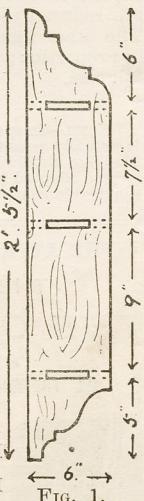


FIG. 1.

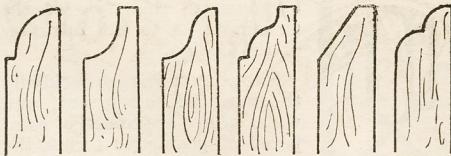


FIG. 2.

extra book space could thus be provided. In this case the end could be finished off square, or it might have a small semi-circular cut as in Fig. 3.

The three Shelves must be carefully cut to an equal size, or the article will not fit closely. If only  $\frac{5}{8}$  inch wood is being used the Shelves should not be over 22 or 24 inches in length. Each one should be cut at the ends as shewn in Fig. 4; the projecting portions may be 2 inches long, and about  $3\frac{1}{2}$  inches wide. These pass through corresponding holes which

must be cut in the uprights, and they are held in position by wedges (Fig. 5) which slip through the small holes in Fig. 4, and thus hold

the entire article firmly. All this part of the work must be done with great care, as the more accuracy the greater strength. If the projecting notches of the Shelves fit too easily, the whole Book Rack will shake, and thus prove a very unsatisfactory piece of work.

It will be seen that, by adopting this method of construction, the article may easily be taken to pieces when desired. At the same time, if carefully made, it will be perfectly strong.

Brass Catches (as Fig. 6) should be fixed to the upper and lower Shelves in order to screw the Rack to the wall.

FIG. 5.

The question of polishing or staining must be left to the worker's judgment. Ordinary woods may be stained or varnished, but Mahogany and Walnut appear to better advantage when polished.

With regard to the spacing of the Shelves, it may be of advantage to state that the common sizes of small bound books are—Foolscap 8vo.,  $6\frac{3}{4}$  inches; Post 8vo.,  $7\frac{1}{2}$  inches; Crown 8vo.,  $8\frac{1}{2}$  inches; and Demy 8vo., 9 inches. In the spaces,  $\frac{5}{8}$  inch extra is usually allowed for "finger room."

Such an article as this could be elaborated to any degree. A scroll ornament might be cut on the Sides with a Fretsaw, or small panels might be carved or inlaid. Again, the Book Rack could be of a larger size, and have four or five Shelves instead of three. These variations and additions need not be discussed here; it is only necessary to point out the principle and general method, and the amateur who can lay claim to a little ingenuity will know how to carry out a scheme of improvements.

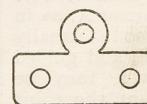
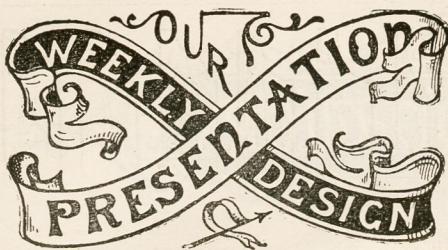


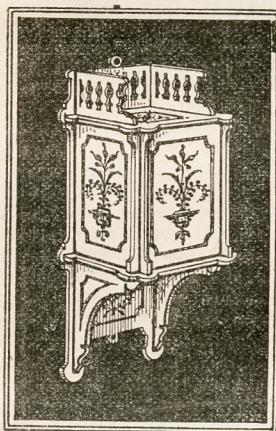
FIG. 6.



No. 4.

## HANGING TWINE BOX, WITH OVERLAY ORNAMENT.

This useful little article has been designed for the purpose of shewing the effect which can be obtained with Overlay work. The Twine Box when cut out is practically solid, the only piece of actual *Fretwork* being the small balustrade at the top. The overlaid panels, however, throw the whole into relief, and although individually they require some delicate cutting, when once glued in position they are free from danger.



Unlike many published *Fretwork* Designs every attention has here been paid to the method of construction, so that even the least experienced amateur can hardly fail to put the article together strongly. Everything is clear. When the six main pieces comprising the Box are prepared, the two sides are first inserted into the back and screwed tightly; the bottom slides into position by a half-cut-through joint, and is also fixed to the back by means of a notch and hole; the front slips on in a similar way, and is firmly attached to the bottom; lastly the top is arranged to slide back and forward freely, so that the twine (or whatever is kept in the Box) may easily be got at. If all the fitting joints are cut accurately, neither screws nor glue will be required for any part except in fixing the sides to the back, as the simple sliding arrangement ensures everything being held in position.

As all the wood required is narrow, almost any plain or fancy varieties might be selected, and the matter may safely be left to the worker. A thickness of  $\frac{1}{16}$  inch is suggested,

using *Inlay* wood  $\frac{1}{16}$  inch thick for the Overlay ornaments. Experienced *Fretworkers* may prefer to *Inlay* the panels, but ordinary amateurs will find it less tedious to adopt the Overlay plan. If a richly coloured wood is used for the Box, and White Chestnut for the panel ornaments, the former should be polished before the Overlays are glued in position. Plain white wood shewing against a polished ground is always very effective.

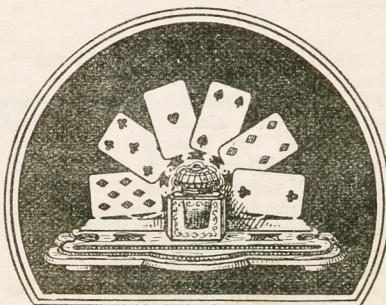
On the diagram sheet all the Overlay borders and panel ornaments are shewn in their actual position. Owing to want of space on the sheet it has been necessary to do this, and the worker must not get confused and imagine that he has to cut these parts out of the solid box. The borders and ornaments must be traced separately on to the thin Overlay wood, and when cut out are glued firmly to the panels in the position indicated on the Pattern. On the Box itself the only parts of real *Fret-cutting* are the balustradings, the twine hole, and the few openings into which the fixing notches are inserted.

To glue on the Overlays is not a difficult task, but one which requires care and neat handling. They must all be gently but thoroughly sandpapered, and their correct positions should be carefully marked before the glue is applied. Unless this advice be followed, something will turn out wrong; and, as may readily be imagined, any inaccuracy has an extremely unpleasant effect. The glue should be applied hot, and with a very fine brush. Care must be taken not to let the edges get smeared, especially if the article is to be left unpolished. Each Overlay when fixed on should be placed under a heavy weight until dry.

It will be noticed that a hole is made in the bottom of the Box for the twine to pass through; holes are also provided in the back for screw nails, by which means the article may be fixed to some wall.

[Additional copies of this design may be had, price 3d. each, on application to the Editor of *Hobbies*, Bouverie House, Salisbury Square, London, E.C. The Presentation Supplements will be given during the current week of publication only, and will not be supplied with back numbers of *Hobbies*.]

No. 5. "CARD" INKSTAND.



The above sketch is a miniature of the full-sized Pattern for *Fretwork* Inkstand, which will be given away with each copy of next week's issue of *Hobbies*.

# BENT-IRON-WORK

## CHAP. IV.—FRAMING.

UNLESS the reader rejoices in the good fortune of having an amateur smithy set up in his workshop, it is not recommended that he should attempt the construction of heavy Frames. If he *can* make them, good and well. But taking into consideration three important points—time, labour, and expense—a ready-made Frame is preferable. To bend thick Iron, not only strong heat is required, but also a heavy hammer, and a large Anvil to work upon.

When Bent Iron Work Patterns are published, either in sheet or book form, quotations are sometimes given for the prices of Frames, Hooks, etc.; and as the Iron is forged to the exact size, and is seldom over-expensive, much trouble will be saved by purchasing the framework along with the Design.

### HOOKS AND BRACKETS.

If the worker arranges his own Patterns, he will find that most firms who deal in Bent Iron Materials have stock Hooks and Brackets in various sizes. Thus the Design may be worked in to suit the size of article purchased. It is usually cheaper to buy Frames in this way than to have them made by a local smith. They are generally lighter, and of better workmanship and finish. Local smiths have a knack of using Iron about three times as heavy as it need be; if a small Wall Hook is ordered, they send something like a gibbet upon which highway robbers could almost be strung up.

FIG.  
26.

Bracket Frames can be purchased in two forms—light, as Fig. 26, and strong, as Fig. 27. Each style may be had with or without the hook. Of course any size and shape can be made to order, but specially made goods must necessarily be a little more expensive.

If a comparatively light Hook be wanted, the worker could form one himself by using two or three strips of Iron, and bending them into shape as seen in Fig. 28. The strips

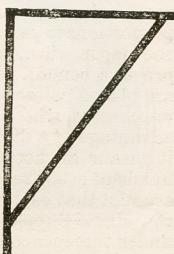


FIG. 27.

could either be riveted together, or clamped with Collar Bands. If a cross bar were wanted, it could easily be made in such a way as indicated in Fig. 29.

### WALL PLATES.

With Hooks and Brackets a Wall Plate is necessary.

FIG. 28.

The article looks unfinished if the Iron is screwed direct to the wall, and some ornamental back (as Fig. 30) is required to complete it. Should the Bracket have to support a

heavy weight, the Wall Plate must be of Sheet Metal, but for all ordinary purposes, wood is quite sufficient. A stout, hard wood, such as Ash or Oak, should be used, and a thickness of about three-sixteenths of an inch is recommended. Any Pattern can be cut with an ordinary Hand Fretsaw. If a Treadle Machine be used, it is suggested to tilt the table heavily to one side, so that the outline of the Wall Plate may be bevelled. This greatly adds to the appearance, and is much more representative of Iron.

FIG. 30.

If the reader is not a Fretworker, a plain back such as Fig. 31 or 32 may be cut, and is often found to be quite as effective as an ornamental one. The wood should receive a coat or two of Black Paint, and thus it will match the Iron. This can hardly be regarded as "deception," and should not come under the sweeping denunciations of our higher Art critics. The wood is blackened, not to make people believe it is Iron, but simply to let it harmonise with the general style, weight, and colour of the Ornament. A choice piece of wood might be polished or varnished, if desired.

With very large Wall Plates, or with Stands for Newspaper Racks, etc., Iron (or "imitation" Iron) would look extremely heavy, and should

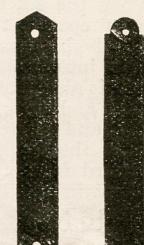
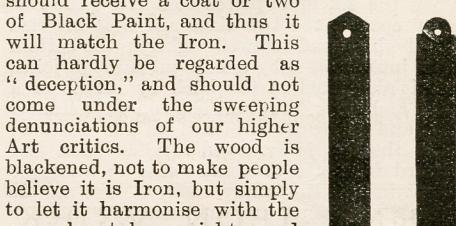


FIG. 31. FIG. 32.

be avoided. In such cases nothing is better than a plain or moulded Mahogany board, with the surface well polished. The worker need not bind himself to Mahogany if he prefers some other wood; polished Oak goes well with Iron, and many other varieties can safely be used.

When Sheet Metal Wall Plates have to be made, it is better to place the work at once in the hands of some Tin or Iron Smith. If they are very ornamental it is customary to plant them on a plain or polished wood back, which causes them to stand out to more imposing advantage.

#### VARIOUS FRAMES.

Square, Circular, and Oval Frames are not so often in demand, and can not always be bought ready-made in various sizes from dealers. However, a smith will not take long in turning out exactly what is wanted.

Here let it be said that when the reader is advised to employ the services of a regular tradesman, there is no suggestion that he himself is incapable of making a small Wrought Iron Frame. It is no question of *ability* which is concerned; it is simply the want of proper tools and appliances which prevents the ordinary amateur from doing this work. In the first place, he has not got a suitable piece of thick Iron, and if he had there are no means of heating it properly; again, his Anvil is too small, his Hammer is too light, and his Vice far too weak for such stout material; then he has not sufficiently large Rivets, he has no brazing Solder, and his Files are all much too delicate to have any effect on the heavy Iron bar. Altogether it is easier for him to order the exact size and weight he wants; and after all the actual Bent Iron Work is only begun when the Frame has been secured.

As with Brackets and Hooks, light square or circular Frames could be made by using several strips of the Ribbon Iron. For small Door Grills, or Panels where no particular stress is laid upon the outer Frame, this plan can be adopted. It looks well, and dispenses with the necessity of securing outside assistance, which no doubt is a certain matter for satisfaction. If the rim has to bear much of a strain however, the Strip Iron would bend, and solid material must then be used.

Descriptions of Iron framing for Gongs, Hall Lanterns, Gas Pendants and Brackets, and other elaborate articles are beyond the range of this chapter. All these have to be specially made, and in the meantime it is only necessary to deal with the simple binding Frames, which are easily procurable. Later on a few words may be said about the more advanced work.

(To be continued).

## BENT IRON WORK.

Send a 1d. stamp for particulars of our New Tool, "THE IONICAL," pronounced by all who have used it to be invaluable for producing accurate spiral curves.

#### →& BAMBOO WORK, &←

The Popular Hobby. Price Lists and Designs sent on receipt of stamp for postage.

THE AMATEUR'S MARKET,  
BRITANNIA BUILDINGS, LEEDS.

## Our Advertising Coupon Scheme.

—o—  
What a Copy of "HOBBIES" is Worth!  
—o—

As announced in detail last week we have now completed arrangements which will enable us to present with every copy of *Hobbies* what, to all intents and purposes, amounts to a Cash Bonus of Threepence.

In future, every copy of our Weekly Presentation Supplement will contain a Coupon which, by special arrangement with our Advertisers, will, under the conditions to be detailed, be accepted by the Firms whose names are printed on the back of the Supplement as an equivalent of Threepence in Cash.

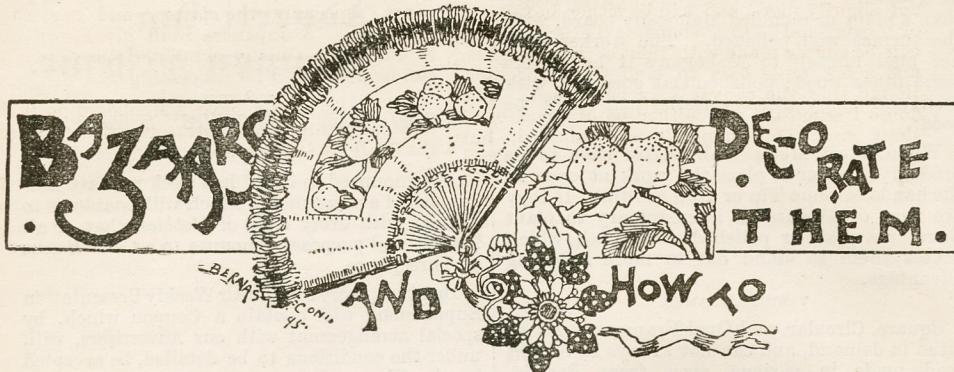
Each Coupon will be numbered and dated, and will remain good for three months. The Coupons will be accepted in payment not only for any articles specifically mentioned in the advertisements in our pages, but for any goods sold by the Firms who have agreed to take them.

The one consideration of any importance is that not more than five per cent. of the amount of any one order shall be paid in Coupons. For example, if it be desired to purchase goods to the value of 5/-, it would be sufficient to send a postal order for 4/9 and one Coupon; if the bill came to 10/-, two Coupons and a postal order for 9/6 would be required; and if the amount were 20/-, a postal order for 19/- and four Coupons would need to be sent. Should less than five shillings worth of goods be required, the sender of a Coupon will be entitled to a discount of one halfpenny for every shilling.

It should be clearly understood that when, for instance, goods to the value of 20/- are ordered, it is not necessary for the purchaser to buy four numbers of the current week's issue of *Hobbies*. All back Coupons should be preserved. Each is available for *three months*, and may be used at any time during that period.

Further details of the scheme, with a list of Firms who have agreed to accept Coupons, will be found on the back of the Weekly Presentation Supplement. A Table shewing the system of discount from One Shilling to a Pound is also given.

We are confident that this scheme will prove a genuine benefit to all who are interested in or connected with *Hobbies*. To the Proprietors it means a larger circulation, and consequently a proportionate reduction in the cost of producing the paper. To Advertisers, in the same way, it proves a benefit, as their weekly announcements are placed before a greater number of prospective purchasers, who will readily be induced to take advantage of a discount of five per cent. Lastly, it means an actual sum of Threepence in the hands of every reader, and when it is taken into account that each week the penny copy of *Hobbies* contains a Supplement which in no case will be under threepence in market value, it will be seen that the real worth of a single number of *Hobbies* is SEVENPENCE, and that every reader thus secures a genuine return of 600 per cent. for his outlay.



## CHAP. IV.—FANCY STALLS.

Bazaars are now so popular, and are so often organised on an extensive and costly scale, that Stall decorations of a distinctly characteristic style should be more widely encouraged. Elaborate and artistic drapery, and rich floral decorations are very effective, but it is now difficult to secure much originality with these materials alone, and without novelty any Bazaar will have a tendency to fall somewhat flat.

When a Stall is to be decorated in a thoroughly unique and striking fashion, and when the particular style has been chosen, the first consideration is the method of framework. In almost every case the skeleton frame as suggested in last chapter will be sufficient for the preliminary structure. Every Stall, no matter how eccentric its decoration, must fulfil certain requirements. It is erected primarily for use, and utility should in no case be sacrificed for ornament.

There need be little difficulty here, however, as hardly any article adapts itself more readily to decorative purposes than a Bazaar Stall. Unless something gigantic and altogether uncommon is wanted, our old method of framework may be relied on. When once up, any extra wood-work is easily fixed on.

The assistance of a practical

joiner may often be necessary for this part of the work, and, indeed, it is better to have his services, as there will be less chance of the whole Stall falling about one's ears at some critical moment. The writer has witnessed many amusing accidents of this sort, and frequently had the honour of rescuing a fair Stallholder from the shattered debris.

Fig. 1 represents a Moresque Stall. At the first glance it may appear rather elaborate, but detail is a feature of this style, and the amount of work required is more apparent than real. The writer can give his personal assurance that any difficulties in the way are comparatively small, as on several occasions he has put up Stalls similar to this. The whole structure merely consists of a delicate wood framing on which is stretched canvas or brown paper. In this case canvas is preferable, as it can be more easily painted, and may be used at a dozen other Bazaars.

Some careful planning is required when the Stall is being framed, but anyone with half an eye for Architecture should be able to strike a good proportion, and to direct the joiner in his work. The sizes once settled, the framing will be easy. All the extra wood work should be light, as there is no strain upon it. The arched front projects

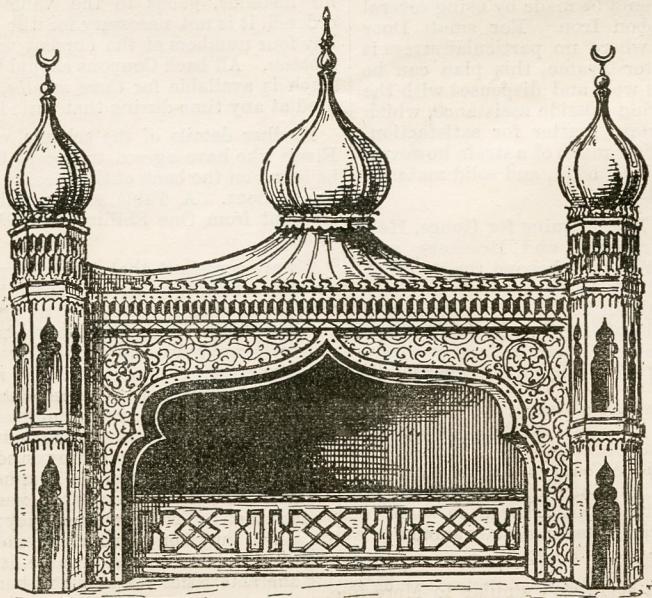


FIG. 1. Moresque Stall.

about ten inches; the side towers stand out slightly more, and can be either hexagonal or octagonal in shape. These towers can be simply made with light corner uprights, and a few cross bars to bind these together. Round this the canvas may be tacked. The dome framework may either be of wood, or of stout wire; both methods are adopted, but canvas is always more easily fixed to a wood frame. Care must be taken to secure a pleasantly curved line for the domes, and also to see that they are placed in a perpendicular attitude, and not leaning to one side.

All the detail and elaboration which is shewn in the sketch is secured by means of the paint brush. The Stall front is merely a twelve foot stretch of canvas, with mouldings and panels roughly indicated on it with distemper colour. The archway is treated similarly; in fact, the

Chinese and Japanese styles are much patronised, especially the latter, and are easily arranged. A Japanese Stall gives very little trouble, as so many characteristic ornaments can be purchased for decorating it.

All Stalls should have a signboard on which may be printed the distinctive title, and also the Stall holder's name.

Chinese lanterns should never be used for illuminating purposes. They may be hung up for mere ornament, but should not be lit, as they are always a source of great danger, and frequently cause accidents. When it is remembered that Stalls are usually composed of most inflammable material, great care should be taken to prevent any chance of fire.

Fig. 2 represents the interior of a Bazaar which the writer decorated a few years ago.



FIG. 2. Old English Bazaar.

whole effect is gained in this manner. It must be admitted that a little knowledge of scene painting is almost necessary in order to secure success, as an amateur who simply executes water colour sketches can hardly judge of what is required for large distemper work.

With Moresque decoration brilliancy in colour is quite legitimate. Vivid reds and bright yellows are wanted, and if carefully blended will carry out the spirit of the style admirably. Indeed, for an effective and popular Stall, Moorish ornament can hardly be equalled; it has always a gay, attractive appearance, and if the Stall holders be arrayed in some fancy and characteristic costume, they should be able to assist the Bazaar finances.

Turkish is a style very similar to Moresque, and Indian and Egyptian, although different in character, are well suited for this class of Stall.

The style is Old English, and the whole work was carried out in the manner just described. Six Stalls are shewn with an extra one at the entrance end for refreshments. There is not space to give a detailed description of the Bazaar, but the reader will gather a rough idea of the general scheme from the accompanying sketch.

In dealing with all these elaborate Stalls, it is impossible here to do more than generalise. When such decoration is seriously taken up, the style should be carefully studied from trustworthy pictures or photographs, as it is only in this way that a true representation can be secured. Technical accuracy in every small detail may not be absolutely necessary, but it is essential to have all the outstanding and characteristic features in harmony with the style and period which are being depicted.

*(To be continued).*



# PHOTOGRAPHY

## for Amateurs

### NOTES OF THE WEEK.

**S**OME of our readers may have seen the Binocular Camera, which in form is exactly like a field glass; in action the lens is pointed to the object, which may be seen on the ground glass on focussing. The negatives taken in the Binocular are about  $1\frac{1}{4}$  inches square, and so admirable is the definition of the lens that enlargements can be made almost indefinitely,—certainly up to half or even whole plate size. This type of Camera has been still further improved, and is so constructed as to take Panoramic views. The suggestion, we believe, originated with a French electrician, and has been perfected by M. Cartpentier, of Paris.

Some years ago Mr. Louis Meldon, an accomplished Amateur Photographer of Dublin, succeeded in taking Photographs of a diver, catching him midway between a diving board and the sea. The plates, upon which these Photographs were taken, received an exposure of  $\frac{1}{100}$  of a second. In a recent number of a contemporary examples of rapid Photography are reproduced, the subject also being divers. For these an exposure of  $\frac{1}{500}$  and  $\frac{1}{1000}$  of a second were given by the operator, Mr. B. O. Cartwright. The definition, judging from the reproductions, is not nearly as good as the earlier and slower work of Mr. Meldon.

The following is the advice of an American writer upon Photography, and although, like much we hear from the other side, it is rather *tall*, still in the main, it may well be laid to heart:—“Be independent, study the work of the best Photographic Artists, and then use your own brains. Work with some high aim. Expose, if you must, a thousand plates, and if you succeed in obtaining what you want with one, destroy the other nine hundred and ninety nine. They are no use, so it is not a waste. After a time you will learn to so control your Camera as to be able to obtain the results you desire without any considerable waste. Take time and think before you act. The greatest fault displayed by the majority of Photographers is in *reckless* exposure. They snap off the shutter anywhere and anyhow, relying on chance for the result. A little thought and consideration would soon convince them of their foolishness, and so save all the trouble of developing to find out what their own senses would have told them.”

It has been suggested by the management of the Royal Aquarium that, if they receive the support of the Photographic trade, manufacturers,

dealers, and others, a Photographic Exhibition will be held in the Aquarium during the months of April and May next.

In connection with the Stanley Show, which opens on the 22nd inst., we notice that there will be a Photographic Section under the management of Mr. Walter D. Welford. In the Picture Division, three gold, seven silver, and seven bronze medals are to be given, and in a special class “for amateurs who have not previously gained a medal or prize at an open Photographic exhibition,” the first prize will be a Hand Camera; second prize, Silver Medal; third prize, Bronze Medal. Three prints are to be sent in for this Class. The Exhibition will be held, as usual, at the Agricultural Hall, Islington, and the judges are to be Messrs. Bernard Alfieri, A. Horsley Hinton, and Rev. F. C. Lambert.

A new Platino-Malt Bromide Printing Paper has just been put upon the market by Messrs. Lumière, a French house. This paper yields good and soft blacks of admirable gradation. It is perhaps a little slower than some others on the market, in our opinion a possible advantage. It may be used for either contact printing or enlargements. Amidol as a developer is recommended, and the following is the makers' formula:—

#### CONTACT PRINTING.

|  |    |    |    |         |
|--|----|----|----|---------|
| Water                                    | .. | .. | .. | 10 ozs. |
| Sodium Sulphite                          | .. | .. | .. | 100 gr. |
| Amidol                                   | .. | .. | .. | 25 gr.  |
| Bromide of Potassium (10 per cent. sol.) | .. | .. | .. | 1½ drs. |

#### ENLARGEMENTS.

|   |    |    |    |             |
|---|----|----|----|-------------|
| Water                                   | .. | .. | .. | 10 ozs.     |
| Sodium Sulphite                         | .. | .. | .. | 50 grs.     |
| Amidol                                  | .. | .. | .. | 25 grs.     |
| Bromide of Potassium (2 per cent. sol.) | .. | .. | .. | 50 minimis. |

The time of exposure must be sufficient to ensure development in from 20 to 30 seconds. When the desired tone is obtained the prints must be washed in several waters and fixed in a bath made up of Water 10 ozs. (or 1000 parts), Hypo 200 parts, Bisulphite of Soda 10 parts, and Alum 2 parts. The prints may be immersed in this bath for from five to ten minutes.

Enlarging is a delightful occupation for winter evenings, and contact printing can also be effected by artificial light; in fact by far the best results are so obtained. Given a good negative,  $\frac{1}{4}$  plate, with plenty of detail, an enlargement

can be obtained up to whole plate that will, if care is taken, have every appearance of a direct print, and will deceive even experts. The early bromide papers gave hard black and white pictures, but the later brands have been greatly improved, and many very beautiful Photographs are produced, equal both in tone, gradation and softness, to prints by the much more costly platinotype process. In due course we shall have a few articles upon Enlarging, and give instructions as to apparatus required. This can be made very inexpensive at home by any "hobbyist."

In the "SHASHIN-SOWA," the Photographic Journal of Japan, we note the publication of an "English and Japanese Dictionary of Photography," and it is interesting to note that, although our own chemical nomenclature often consists of words of many letters, "pyrogallic acid" is to be preferred to the Japanese equivalent, *i.e.* SHYO-SEI-BOTSU-SHIOKU-SAN, and the English abbreviation "pyro" to the BOTSU-SHIOKU-SAN, which is the equivalent in Japanese. Still one can but admire the rapidity with which Japan has adopted the "manners and customs of the West" even in Photography. Much of the rapid advance made in Photography is due to the exertions and interest taken in the art-science by Professor W. N. Burton, a young Scotchman, a sanitary engineer, who is well known as a writer upon Photography, and an expert. About eight years ago he left England to take the chair at the Tokio University as Professor of Sanitary Engineering, and from the day he set foot on the "Land of the Rising Sun" to the present, he has never ceased to be interested in advancing Photography. He was founder, and has been President of the Photographic Society of Japan, which is a most thriving concern, having a larger membership than the Royal Photographic Society of Great Britain. Japanese Photographs are very beautiful, and are the reflex of the high culture and art-love of the Jap.

For some years past *Photography* and other Photographic journals have exchanged sets of Lantern Slides with Colonial and American societies. There is, however, little or none of this inter-change of courtesies between the Photographic societies on the continent and the home journals, clubs, and associations.

There are many firms who let out Lantern Slides on hire. Perhaps no firm in Great Britain do more in this direction than Messrs. Riley Bros., of Bradford. Their system is a perfect one, and is the outcome of many years' experience. In the admirable Catalogue of 320 pages which they issue will be found most concise particulars. Acting upon these the hirer will receive the slides with the utmost promptness.

We hope some of our readers will take up Stereography. Next to the Lantern the Stereoscope gives most pleasure, and certainly the best rendering of a Photograph. We have witnessed the astonishment of men in the prime of life, who for the first time looked at a Photograph through a Stereoscope. It will give us pleasure to advise upon how best to take a negative in order to print from them Stereoscopically.

## Prize Competitions

It is our intention that all Competitions which will be announced from time to time in this column shall be decided by the skill or ingenuity of the Competitors, and not be in any way dependent on chance. Prizes will be given for Articles of Fretwork, Carving, etc., Designs, Sketches, Photographs, Essays, and numerous other subjects which will be stated in due time. The Prizes offered will take the form of Cash, Fretwork Machines and Outfits, Cameras, and other articles.

### FRETWORK.

We hope later on to offer a valuable Prize for the best Fretwork Model made from the St. Paul's Cathedral Design which we are presenting to annual subscribers, and which was fully described in No. 1. Meanwhile we offer Three Prizes for the best Midget Photograph Frames made from the first Presentation Design:-

First Prize, A Treadle Fretwork Machine, with Nickel Plated Tilting Table, Dust Blower, and Emery Wheel.

Second Prize, A Finely Nickel Plated and Polished 14-inch Hand Fretsaw Frame.

Third Prize, One Gross of the best Fretwork Saw Blades.

The choice of wood, method of cutting, and all matters relating to the actual work are left entirely to Competitors. The Frames, for example, may either be polished or left plain. All Frames should be packed securely, in a cardboard box if possible, and must have the name and address of Competitor *clearly written on a label which must be securely attached to the Article itself*. Frames sent in for Competition will be returned, if desired; for this purpose a fully addressed and *stamped* label must be enclosed. In no case can Articles be returned unless sufficient stamps are sent to cover postage. Parcels should be marked "Frame," and must be received at our office not later than November 23rd.

### PHOTOGRAPHY.

We will give every month a prize of Ten Shillings for the best Photograph, not to exceed 7*1/2*-in. by 5-in., and Five Shillings for the second best. The choice of subject is left entirely to the Competitor. Photographs cannot be returned, and we reserve the right to reproduce any of them in *Hobbies*, if thought desirable. Photographs for Competition will be received up to the last day of each month, and those for the first Competition must be sent to our office not later than November 30th, marked "Photo."

### LANtern SLIDES.

For the best Pen and Ink Sketch of a set of three original humorous Magic Lantern Slides we will give Ten Shillings, Five Shillings being awarded to the second best. The subjects are left entirely to Competitors. Sketches should be full size, and should be drawn in Pen and Ink only. The Prize Sketches, if of sufficient merit, will be reproduced in *Hobbies*. Mark "Slides," and send in by December 7th.

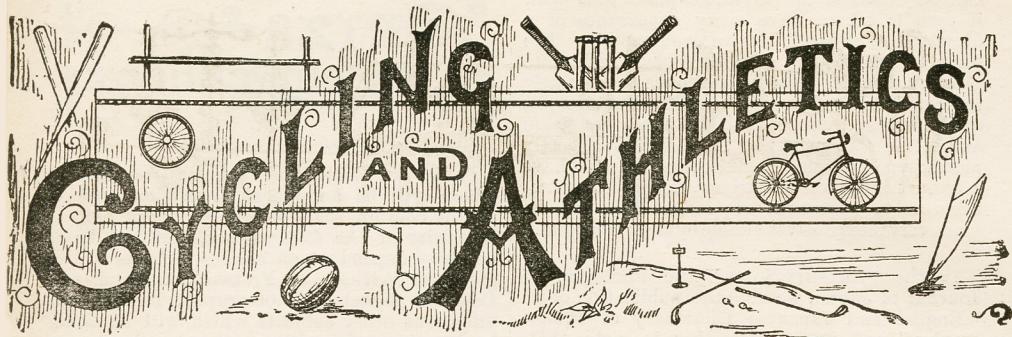
### BAZAARS.

Two Prizes of Ten Shillings and Five Shillings are offered for the best suggestions for a Bazaar Side Show. In deciding this Competition the novelty and practical character of the suggestions will be chiefly taken into account. Paragraphs must not exceed 200 words in length, and must reach us by November 16th. The Envelope should be marked "Bazaar."

### NOTICE TO COMPETITORS.

All Articles, Sketches, etc., for Competition should be addressed to the Editor of *Hobbies*, Bouvierie House, Salisbury Square, London, E.C. The name and full address of Competitor must in every case be sent.

NOTE:-No correspondence can be entered into with Competitors, and all awards made will be final.



### NOTES ON SPORT.

THE best critics of walking are unanimous in praise of Sturgess' great walking feat. It is true that Sturgess did not beat the world's record quite, neither did he quite touch the time made by Hibberd, but he was within 19 secs. of the former and accomplished as much all but some 30 or 40 yards as Hibberd. The report of Sturgess' style, however, is so good that we are bound to class his performance as at least equal to the best. 'Hibberd,' says a well known and thoroughly competent critic, 'could not be compared as regards style and fairness with Sturgess.' Another writer proclaims the feat as the 'finest exhibition of natural walking' he had ever seen in a 30 years' experience.

Bradley, the champion English sprinter, and one of the team of the London Athletic Club which recently suffered such a signal defeat in New York, has returned to England. He says he does not like the Americans or the American ways at all. He considers the New York Press, in commenting on the match, did its utmost to create bad feeling where none originally existed. Mr. Bradley considers the Americans are a long way from perfect in their management of sports. On one occasion in a 50 yards race the starter made a mull of the pistol firing five times before he succeeded in effecting what he considered a satisfactory start. Even then it was anything but satisfactory to Mr. Bradley, who was left on his mark, but was then only defeated by a few inches. Reverting to the circumstance Mr. Bradley more than hints that the American runner, his opponent, was 'intended to win.'

The Americans are tremendously proud of Wefers, their champion sprinter, who beat Bradley by 6 inches in the international games. Wefers has recently covered 300 yards in  $31\frac{1}{2}$  seconds, which is world's amateur record. It beats the time of the 'Flying Yankee,' L. E. Myers, by  $\frac{7}{10}$  of a second, and the English record by  $\frac{4}{10}$  of a second.

England has one consolation from the fact that Harry Hutchens, the Putney Professional, holds the world's record of 30 seconds for the distance. This is considered the most marvelous short distance running performance ever accomplished, and with it we may safely defy the Yankees probably for a long time to come. It means that Hutchens could have given Wefers something like 11 yards start and a

good beating. Wefers is, of course, an amateur, and Hutchens a professional, but the variation in speed is so marked as to be well worthy of remark, despite the difference in status between the men.

Some splendid turnouts are reported for the preliminary cross country runs. In an inter-club spin at Leeds 60 men took part. The Polytechnic (London) Harriers had a muster of 50 recently, while plenty of other clubs in all parts of the country boast 20, 30, and 40 members in active work. There is no prettier sight in athletics than to witness the turnout of a good strong cross country club, or to meet the men in 'full cry' when well set and going all together. An ordinary run often makes a prettier sight than a race, as in the latter there is frequently more scrambling and jostling and less style than when the spin is a quiet or practice one.

Stocks has ridden over 29 miles in the hour, which is wonderful going. The performance is the finest path ride of the year, and is entitled to a great deal of respect. Stocks rode a machine to which was attached the new 'lever' chain, but we do not consider this fact a particularly significant one, although the promoters of the lever chain naturally make much of it. Stocks' time is only slightly superior to previous attempts of his when conditions were not so favourable. The 'lever' chain claims a speed advantage of something like 25 per cent., but in spite of numerous trials nothing so far has been accomplished with it which has not since been beaten by the ordinary plain chain, with the exception of this ride by Stocks. Stocks' time is simply grand, but then Stocks is admittedly the best man we have for such a ride as this, and this performance after all is but a shade better than the previous best. If the lever chain cannot show at least a twenty per cent. advantage, it is a fallacy. Five minutes conversation with an experienced engineer fully confirmed our previously formed idea that there was nothing whatever in it.

The list of applications for membership in the Cyclist Touring Club is a sign of the times. The October number of the Club Gazette contains the names of more than a score of titled persons. Lord this, Lady that, Viscount so-and-so, and the Hon. something else, make between them quite a formidable body.

\*\* The charges for advertisements (prepaid) in this page will be sixpence for every twelve words or less, name and address inclusive, and one halfpenny for every additional word. Single letters, initials and figures are each counted as a word; but undivided numbers (as 152), and prices (as 10s. 6d.) count as only one word each. In every case the name and address of the advertiser must be given for publication, and we cannot at present undertake to supply a private name or number and receive replies to advertisements at our office. All advertisements must be accompanied by remittances, otherwise they cannot be inserted. Whenever possible, payment should be made in Postal Orders, and not stamps. Letters should be marked "Advt." and must be addressed to the Publisher, *Hobbies*, Bouvier House, Salisbury Square, London, E.C.

NOTE.—Trade Advertisements can only be inserted in this page at the rate of one shilling per line.

**A. Bargain.**—A Splendid Bullfinch, House Moultered and very tame, price 5/-; also a good Canary, 6/- W. George, 67, Hood Street, Northampton.

**French Books.** My monthly catalogue of French literature, post free on application. Hector, book-seller, Birmingham.

**Fretwoods.** 4-inch Canary Wood, 3*1/2*d.; Walnut, Mahogany, Oak, Cedar, 4*1/2*d. per foot. T. Carter, Lichfield. D 1

**Fretwork, Carving.** Lists 48-56 free. Henry Zilles, 26, Wilson Street, Finsbury, London.

**Fretwork, Carving, Bent Iron, and Bamboo Materials;** Fretwork Outfits from 9d., Bent Iron 5d. and 6d. per pound, splendid Fretwood from 2d. per square foot. Lund, 70, Manningham Lane, Bradford.

**Important to Librarians, Clubs and Institutes,** 460 volumes of the latest authors to be sold at a great reduction, in perfect condition, in one lot or lots of 50. Offers. No dealers. W., Castle Library, Reigate, Surrey.

**Mail Carts,** Baby Carriages, &c., superior. Presland and Sons, Invalid Carriage Factory, 495, Hackney Road, London. Lists free.

**Newspapers.**—Punch for sale, a complete set, 1841 to 1894, bound in half morocco, cloth back, just finished by binders, £20 cash; also a set from 1860 to 1894, bound in same style, £10 10s. Can be seen any time. S., 6, Harpur Street, W.C.

**Picture,** size, 9 ft. by 7 ft.; excellent copy of Raphael, The Holy Family, very good painting in very good frame, 45 guineas, or offer. Anson, Westbourne, Sussex.

**Poultry and Ducks.**—All the useful and fancy varieties of Poultry and Ducks for stock and exhibition purposes supplied by R. B. Rose, the Aviaries, Sutton, Surrey.

**Powerful pair Jockey Club Glasses,** for field or opera price, 10/- F. J. Rowe, 11, Alkerden Road, Chiswick, Middlesex.

**Several Fretsaws and Lathes,** second hand, to be sold cheap. Send for Monthly Register containing details of Engineers' Tools, etc. Britannia Co., Colchester, and 100, Houndsditch, London. State your precise requirements.

**Sewing Machines.**—Lockstitch Sewing Machine, perfect condition, 14/-, bargain. Geo. Frampton, New Inn, Charnminster.

**Stamps.** Wanted, collections or loose collector's duplicates sent approval. Collector, 7, Charleville Circus, Sydenham.

**Stamps.**—Saint Christopher, obsolete, rare; Saint Helena, Saint Thomas, Hawaii, Victoria, scarce official; Pahang, Congo, Paraguay, Novanugger, Newfoundland, Johore, Haiti, Cashmere; 43 excellent genuine varieties, 1/1. Smith, Arthur Road, Kingston, Surrey.

**Steel Files and Tools.**—Amateurs supplied with small lots at lowest prices; inquiries invited; stamped envelope for prices, &c. Gillam, Milton Street, Sheffield.

**Turning.**—Capital Lathe, nearly new, complete, with 40 tools and chucks. Dingle Lodge, Reigate.

**Wanted,** 49th Annual Report of the Registrar General (1886). State price. Tebb, Boscombe-hill, Bournemouth.

**3000 Library Books** to be disposed off, all in fairly good condition. 2-Vol. Novels, 1/3; 3 Vols. for 1/6; 6 Vols. for 2/6; 12 Vols. for 4/6, Carriage paid. Baile's Library, Streatham Place, S.W.

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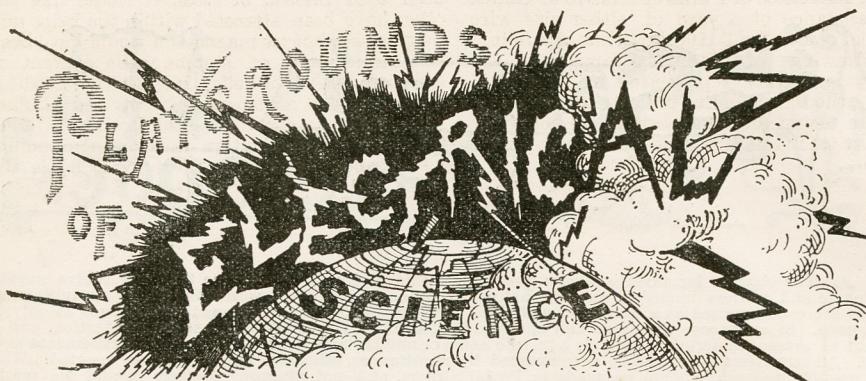
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London, E.C.



## THE INDUCTION COIL.

### HOW TO MAKE AND USE IT.

#### CHAP. II.

**L**ITHERTO only what is termed Statical Electricity has been considered, but it will now be necessary to enter upon another and vastly more important branch of the Science, dealing with the Electric Current.

To produce a current it is necessary to have some piece of Electrical apparatus which can continuously maintain a disturbance of the Electric fluid much in the same manner as a water pump is capable of causing a continuous flow of water. Briefly, then, this is accomplished by the Electric Battery and various machines, notably the Dynamo; it will, however, be sufficient to discuss the former only.

Referring to Fig. 6, Z and C are plates of Zinc and Carbon partly immersed in a dilute solution of Sulphuric Acid and water. If the Zinc plate is composed of chemically pure Zinc the acidulated water will at present have no action upon it, and the circuit being incomplete there will be no current. But there does exist a disturbance of Electrical equilibrium, which only waits for the poles pz, pc—that is, the tops of the plates to be joined together by a conductor to force a current round the now completed circuit. Say that the current starts from the pole pc, or the top of the Carbon plate, it will pass through the connecting wire, down the Zinc plate, through the liquid, and up the Carbon plate back again to pc. For the passage of a current it is therefore necessary to have a complete conductive circuit through which it may flow uninterruptedly, and any break in that circuit stops the current. During its passage there was a certain amount of Zinc dissolved in the liquid, forming

a soluble salt, Zinc sulphate, and so long as there is Zinc capable of being acted upon, and Acid capable of acting upon it, just so long will it be possible to keep a current flowing. It has previously been said that there exists a disturbance of Electrical equilibrium between the plates Z and C, or more properly between the poles pz and pc. It will now be convenient to be more definite, and say that there is an Electrical force (Electro-motive-force) or pressure, which for practical purposes is measured in units called Volts, and, when permitted, this pressure will cause a current to flow round the circuit. The amount of the current is expressed in units termed Amperes. The following law, named after its enunciator,—Ohm's law, connects these two factors with a third, and gives their mutual relation. Thus:—

$$\text{Current (in Amperes)} = \frac{\text{Pressure (in Volts)}}{\text{Resistance (in Ohms)}}.$$

The resistance, which has the Ohm for a unit, is a force which conductors exercise in opposition to Electrical pressure. All conductors offer resistance, though some much more than others; good conductors the least, and extremely bad conductors, previously termed insulators, the greatest. The resistance of any conductor is directly proportional to its length, and inversely proportional to the area of its cross section. All wires used for Electrical purposes are classified in gauges, by being numbered in accordance with their cross section. The two gauges most commonly used are the Standard Wire Gauge (S.W.G.), and the Birmingham Wire Gauge (B.W.G.). These two gauges are so nearly alike that for most purposes they may be used indiscriminately. For the sake of example it will be interesting to take two pure Copper wires and compare their resistances. No. 1 wire, B.W.G., has a sectional area of .0707 sq. inch, and is .3 inch in diameter; a mile of this wire has a resistance of only .6 of an Ohm. This, then, is a very thick wire, consequently of a very low resistance, and is suitable for a large current. Now take a much thinner wire, say No. 30, and refer to its cross section. It is only .0001 sq. inch, and its diameter only .012 inch;

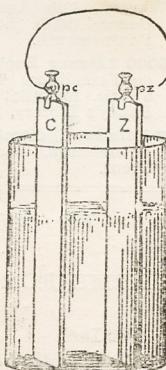


FIG. 6.

but the resistance of 1 mile of it is 378.51 Ohms. The resistance of a yard of either size wire would, of course, be 1.1760 part that of a mile.

In drawings of Electrical apparatus the Battery is usually represented by a symbol, thus,  $\parallel$ , the long thin line indicating the Carbon plate, or technically the positive element, and the short thick line the Zinc plate, or negative element. In Fig. 6 is shewn a single cell. This when used alone forms a complete Battery in itself; but a Battery may consist of a great many such cells joined together, to give more powerful results. For

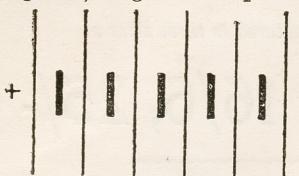


FIG. 7.

example, Fig. 7 indicates a Battery composed of six cells joined up in series, that is, with the negative

element of the first cell connected by a wire with the positive element of the second cell; the negative of the second with the positive of the third, and so on through the whole Battery, leaving the two end elements free. If each cell gives a pressure of say two Volts, then the pressure of the whole Battery will be  $2 \times 6 = 12$  Volts.

But it is well to consider that each cell possesses within itself a resistance, say, for example, of half an Ohm, and by joining the six cells in series the total Battery resistance is brought up to  $.5 \times 6 = 3$  Ohms. Another arrangement is shewn in Fig. 8, where all the positive plates are joined together to form one large element, and all

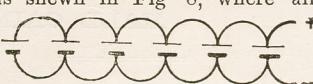


FIG. 8.

the negative plates the same. This is termed connecting in parallel, and the voltage of the Battery so arranged is only that of one cell, that is, two Volts, but the total Battery resistance is reduced to one-sixth part that of a single cell, or  $\frac{1}{6} \div 6 = \frac{1}{36}$  Ohm. Modifications of these two arrangements are also possible, giving various voltages and resistances.

Prominent among the properties of the Electric current are those of Magnetisation, the power of acting magnetically, and the property of induction. Its magnetic properties may be easily demonstrated by winding a piece of cotton or silk covered wire into the form of a helix, or hollow cylinder, like H in Fig. 9, and

passing a current through its coils from a battery B. Now suppose that a short piece of steel wire N, say a common

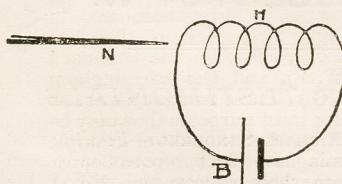


FIG. 9.

sewing needle, be brought to the mouth of the helix, then, if the current is sufficiently large and the number of coils sufficiently numerous, the needle N will be forcibly drawn within the helix. Moreover, the needle will itself become permanently magnetised. Had a soft iron wire

been used instead of steel, it would like the other have been attracted within the helix and magnetised, but its magnetism would have been lost immediately on stopping the current or extracting from the helix. It is perhaps needless to remark that a suspended or pivoted Magnet free to move in any horizontal direction will set itself in such a position that one end points direct to the magnetic north pole, while the other end obviously points to the magnetic south pole: it is, of course, assumed that the Magnet is a straight one. The mariner's compass owes its action to this property of the Magnet.

If, however, it is so arranged that a suspended or pivoted Magnet pointing N. and S. has a current flowing parallel to it, as in Fig. 10, then the current will endeavour to divert the Magnet from its natural position, and will tend to set horizontally at

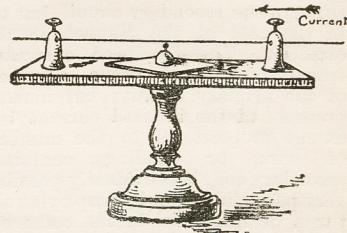


FIG. 10.

right angles to the current. This interaction of the current and the Magnet may be roughly stated as the actuating principle of a very common form of Electric measuring instrument, the Galvanometer. The Galvanometer has a great many different forms, suitable for widely different purposes, but it may briefly be described as a magnetic needle suspended or pivoted in or near a coil of insulated (silk or cotton covered) copper wire through which a current may be passed parallel to the normal position of the needle. The needle, or more frequently a light pointer attached to it, indicates the amount of the deflection on a fixed card or dial.

Current induction may be said to be of two kinds, that produced by the action of a Magnet, and that caused by a primary current. It will be most convenient to deal with them in their order. In Fig. 11 is shewn a helix of wire, H, connected with a sensitive Galvanometer G. On placing the Magnet M, which should be a powerful one, inside the helix, a momentary current will be induced in the wire, as will be shewn by a deflection of the Galvanometer. Taking the Magnet out again also

induces a momentary current, but this time it will flow in the opposite direction, and the deflection on G will be reversed. Suppose now that instead of a Magnet and one helix, or coil, two coils are employed, one being wound over the other, and forming parts of two separate insulated circuits. One coil, termed the primary, is to have a current passed through it from a Battery (see Fig. 12) and the other, or secondary coil, is connected with a Galvanometer. Remember there is no Electrical

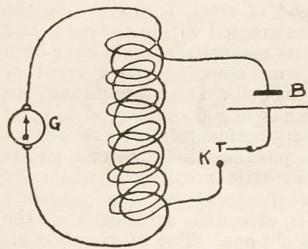


FIG. 12.

connection between the two coils, or other parts of the two circuits. On starting the current round the primary coil by closing the Key K, a deflection will be shewn on G indicating a momentary induced current in the secondary circuit.

Having let the Galvanometer needle come to rest again, break the primary circuit by opening the Key, and another current will flow through the secondary circuit, but this time, as in the case of the Magnet, in the opposite direction. These induced currents are only transitory, and only occur at make and break of the primary circuit; but inasmuch as the pressure of the induced current is to a great extent proportional to the number of turns of wire, or windings, contained in the secondary coil, it is evidently possible to obtain very powerful effects by employing a great many turns of fine wire in its construction. The voltage between the terminals, or ends, of the primary coil can at most be only that of the Battery, but the current may be large owing to the small resistance of the primary circuit; the pressure, however, between the terminals of the secondary coil may perhaps be reckoned by a great many thousands of Volts, although the current will be very small indeed.

Here, then, is demonstrated the theory of the Induction Coil proper, which, together with several minor pieces of apparatus, constitute what is sometimes called the Inductorium, which was, in its entirety, devised by Ruhmkorff, and to the practical construction of which it will now be necessary to pass.

(To be continued.)

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## OTHER TESTIMONIALS.

From MR. RICHARD PENDEREL.—Five hundred thousand words have been written in fifteen months with one "Swan" pen, and without the slightest evidence of wear in the pen.

From THE ARCHBISHOP OF YORK, Coatham, Redcar.—Though I have only had your pens in use for a month, I must write a line to say how intensely grateful I am to you for bringing them to my notice.—Yours very gratefully,

W. D. DALRYMPLE MACLAGAN.



In these columns we shall be pleased to answer questions on all subjects coming within the scope of *Hobbies*, but it must be understood that, as space is necessarily limited, we cannot attempt to reply to those queries which are of purely personal interest. In no case can we reply to enquiries by post. We shall always be glad to hear from our readers, and to receive suggestions with regard to *Hobbies*. All communications should be marked "Correspondence," and must be addressed to the Editor of *Hobbies*, Bouverie House, Salisbury Square, London, E.C.

#### FRETWORK AND CARVING.

J. BROWN.—Always apply glue *hot*; otherwise you need not expect it to make a strong joint.  
ITALIA.—You can obtain excellent photographs of Italian Wood Carving at the South Kensington Museum. The charge, we believe, is very moderate.  
J.P.D.—Fretwork Paper Knives should not be sharpened with an ordinary knife. The edges must first be trimmed with a file, and afterwards smoothed with fine sandpaper.

#### METAL WORK.

IMPATIENT.—Your pseudonym is well selected, but we can safely promise that such articles as Grills, Gas Brackets, Lanterns, etc., will all be dealt with in the Bent Iron Work series.

#### STAMPS.

T.O.—The 1 anna red and  $\frac{1}{2}$  anna blue of the first issue of India are worth, respectively, 1s. 6d. and 1s., if in good condition.  
C.W.E.—The leading Stamp Catalogue published in this country is that issued by Stanley Gibbons, Limited, 391, Strand, London. It is 3s. 6d., post free.  
J.L.—Grave doubts are entertained as to the bona fides of the Abyssinian stamps. Better leave them severely alone. At the best they are only of local franking power.

#### PHOTOGRAPHY AND LANTERNS.

T.S.M.—Using a  $\frac{1}{2}$ -plate lens the distance from sitter would be about 12 feet.  $\frac{1}{4}$ -plate about 18 feet.  
C. BIRD.—Use any of the well-known brands of plates, and give a drop-shutter exposure, with lens working at f/11.  
JOHN BOSWELL.—Photograph received. You should have sent the title. We note that it is "The Pavilion at Brighton." In future competitions kindly bear this in mind.  
E. B. ROGERS.—You will have no difficulty in getting a good oil Lantern for £5. We cannot name specific makers, but you might with advantage consult our advertising pages.  
T. L. BUCK.—If you intend to purchase a Lantern screen, go in for one of the washable opaque screens. Most dealers now supply these, and they are fast taking the place of the linen sheet.  
T. COLE.—We cannot answer your queries in this column. You had better buy an elementary book, "Photography in a Nutshell," published by Iliffe & Son, at 1s., would be just the book for your purpose.

LANTERN.—The dissolving effect can only be properly obtained by using either a biunial Lantern, or two side by side. Care must be taken that the two discs when superimposed exactly coincide.

RADIATOR.—It is not wise to attempt too large a picture in a room such as you describe. A disc 6 feet in diameter will give you good definition with your 4-wick lamp. Further enlargement will be at the sacrifice of illumination.

MILLETT.—You would find that a  $\frac{1}{4}$ -plate camera would answer your purpose. You ask us to name a good maker, this we cannot do. You will be quite safe in going to any respectable photographic dealer. We do not advise the purchase of second-hand apparatus.

W. B. WOODLAND.—Some interesting, instructive, and amusing results may be obtained by using a glass tank in the Lantern. "Pond Life" thus shown is wonderful; "Water Weeds," the "Dissolution of Crystals," admixture of colouring matters, and scores of other simple experiments will delight your audience.

J. D. FORBES.—A very considerable number of George R. Sims' poems have been illustrated by Lantern Slides, and can be had of almost any dealer who lets out Slides on hire. Lantern Slides for three of Mr. Sims' poems—"The Magic Wand," "A Bunch of Primroses," and "The Level Crossing"—we have, and shall be pleased to lend them to you or any other "Hobbyist" on payment of postage.

R.S.C.—There is practically no difficulty in making Lantern Slides by contact.—The Lantern plate is laid over the negative in a printing frame, an exposure given to an ordinary gas flame burning about 5 feet per hour. The duration of the exposure will vary according to the density of the negative, and the distance of the printing frame from the flame, say from 5 to 45 seconds, or more. This matter will be fully treated of in the articles now appearing upon the "Magic Lantern."

#### OUTDOOR HOBBIES.

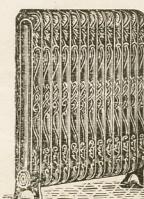
J.B.W.—*Hobbies* will deal fully with Golf and the other outdoor amusements in due time.

EXCELSIOR.—The first ascent of the Matterhorn was made by Mr. Edward Whymper, about 30 years ago. A full account is given in his interesting work, "Scrambles amongst the Alps." The book is somewhat expensive, but can be obtained at any large circulating library.

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# Hobbies of that Day.

\*\* It may here be stated that an Expert has been specially arranged with to give the readers of *Hobbies* advice and information of a practical nature about Poultry, Bees, Rabbits, Dogs, Horses, Pigs, Cage Birds, and Fancy Stock; also on all matters relating to Land, Allotments, Gardening, Trees, Plants, Flowers, Fruit, Vegetables, and on all home and outdoor Hobbies that are of a profitable nature. Replies to queries will be made as generally interesting as possible. It may be as well to say here that we intend to develop the practical side of these and other paying hobbies, and that we shall spare no expense in securing the best practical assistance for the benefit of our readers.

## APPLES AND PEARS.

**J**F one takes into account the small area of ground covered by a fruitful tree, there is hardly a more profitable subject in all the field of culture. This applies to any form of tree—bush, pyramid or cordon, Apple or Pear, and to any age. Last week a well-known nursery firm exhibited some two-year-old specimen trees, the crop on which had been valued at £100 per acre. As trees pay more—to put it tersely—each season after the year when they were established, right on till they become enfeebled with continuous bearing, and are (or should be) cut down, the subject of profit, so far as trees are concerned, may here be dismissed. It has served, however, to introduce the two or three principal or necessary conditions of culture, without which neither hobbyist nor specialist can make Fruit growing possible. Let us take by way of illustration one of the newer forms of Fruit trees, such as this:—

### AN AMATEUR'S STANDARD.

This form of tree was originated by a tree specialist, to enable the planter to get a good crop on his tree the year after planting, and to give him Fruit from the spurs on the stem whilst the head of the standard was being developed. Here we have the system of getting at immediate profits from tree planting.



An Amateur's Standard.

In five or six years' time, under good culture and management, a standard-headed tree would begin to pay for itself,—that is taking Fruit tree culture as it used to be. For a first cost of 2/- or 2/6 per tree, one may begin having Fruit from the outset, in such a quantity and of such quality that the profits therefrom will be pretty certain to pay for the cost of the trees the first season after planting. Take the Cox's Orange Pippin Apple, or the Doyenné du Comice Pear, gathered from one of these trees and kept till Christmas. It is no exaggeration to say that fair samples of either are at Christmas-time worth ½d. each. The trees are capable of bearing at least six dozen each, at a value of 3/-. Every season afterwards, for many years, they should yield more. No doubt many people who read this will have seen the "wonderful" Apples and Pears that have been so plentiful at the Autumn Shows this year. Those Fruits are the produce of two or three-year-old trees, grown in the open ground under ordinary but sensible culture.

### THE METHOD.

We need not go back to the propagating: that is, the grafting of a scion on a seedling or a dwarfing stock. Amateur growers will always do best to buy their young trees worked and trained ready for them. The soil must be of a fertile nature; it should have a sunny and sheltered exposure, and must be free from stagnant water. The soil should not be old and exhausted, nor yet must it be of that stony or chavicky nature which rests on a subsoil of solid clay. A rather strong, rich, loamy soil resting on a porous subsoil is the best for Fruit tree culture. To establish such a soil is by no means easy. It may be done by draining the surface, by breaking up and draining the subsoil, and by bringing in fresh loamy soil to nourish the roots of the trees. To grub out any old tree and to plant a young one in its place is the way to produce a stunted cankerous tree that will only bear inferior Fruit. The preparation of the soil, and its suitability, as well as its after management, all require consideration, and also methodical handling. In the smallest garden it is possible to have some trees

that will pay well with thoughtful cultivation. Possibly the best step to take where only a few trees are going to be experimented with, would be to get a cartload of fresh loamy soil for each tree, to mix into it a couple of barrow-loads of well decomposed farmyard manure, and to make a hole in the ground not less than two feet deep to put this in. The old soil should then be taken away. When the hole is open, before putting in the new soil, the subsoil can be attended to. If it be of a clayey or stony nature it may be taken out and the space filled up with the old surface soil, but even this site will have a fault if it acts as a well for holding the rain water. The cutting of a drain at a depth of three feet towards the nearest outlet or slope in the ground will be a remedy for this. As soon as the new soil has settled down it will be time to plant the tree. For several reasons, before Christmas may be named as the best time. Previous to winter the ground has not fully cooled down, and young roots will thus have a chance of taking hold. The buds will get an earlier start in spring, and the blossom will have a better opportunity to set strongly. In nurseries the best trees are usually gone long before Christmas.

When Fruit growing is practised on a larger scale, the preparation of the soil must receive careful attention. In the actual work, planting of roots is the principal consideration. Roots spread out horizontally by nature, and they must be so placed by the planter. They should be examined and trimmed if necessary, every damaged piece being cut off with a sharp knife—the cut being made from the *under* side of the root. All long bare roots should be cut back in the same way. A stout stake is necessary to support the tree, and this should be driven in first. Let some one hold the tree upright with one hand, while with the other he uses a blunt stick with which to settle the soil among the roots as it is gently shovelled in. When the roots are all covered and the soil comes up to the collar of the tree (*i.e.*, to where the earth covered it before) tread the soil down gently; then spread a thin layer of manure over it, and finally cover with two or three inches of soil so as to form a small mound. Tie the tree firmly to the stake, using a piece of strong tarcord, and put a strip of sacking or tarred roofing felt around the stem to protect it from chafing. A mulching of strawy manure may also be applied, and the tree then left to do its best.

#### DWARFING STOCKS.

A fruitful tree is known by its roots! The Paradise and the Quince Stocks have almost revolutionised work in nurseries. By their use, dense and compact balls of roots, covered with the hair-like feeders, can be made in much less time than was formerly occupied in tree growing. Any one who digs up a seedling tree—Apple, Pear, or any other—will find a few roots on it of a more or less long and straggling habit. Only severe root pruning and frequent transplanting will alter their character or make them at all like those in the illustration. Yet this is a picture of what the roots of every tree grown on a Paradise Stock should be like by the time it is three years old. Such roots as these make trees fruitful, there is no possibility of their being otherwise; and under ordinary conditions they will be covered with blossom every spring. Apart from

that, the fruit they bear will be of the finest quality and of a large size. It is simply a question of there being a large stomach, a good digestion, and plenty of food. The roots are the stomach, their amount of feeding or absorbing power represents the appetite, and the food comes from the good and fertile soil. Apple trees on the Paradise, and Pear trees on the Quince Stock, may be planted very closely upon the ground as they are small and keep in a dwarf condition for a long time. If only trees are to occupy the ground, 1,000 of them—one to every four or five

square yards—might be planted on a single acre. If in three years' time half of them be transplanted to fresh ground, and be allowed to occupy an acre to themselves, these two acres should (and would) be most profitable. Among the best sorts of Apples for profitable culture may be named, in the order of ripening—Mr. Gladstone, Beauty of Bath, Devonshire Quarrenden, Kerry Pippin, Golden Pippin, Blenheim Orange, King of Pippins, Ribston Pippin, Cox's Orange, Peasgood's Nonsuch, Washington, Scarlet Nonpareil, Beauty of Kent, Lord Burleigh, Rosemary Russet, and May Queen. The Apple Lord Suffield is the largest of the early class, while the Wellington takes the foremost place among the late ones. Of good pears, in their seasons' order, may be named:—Jargonelle, Williams' Bon Chretien, Louise, Bonne of Jersey, Marie Louise, Pitmaston, Duchess, Beurré Superfin, Beurré Hardy, Beurré Diel, Doyenné du Comice, and Easter Beurré.

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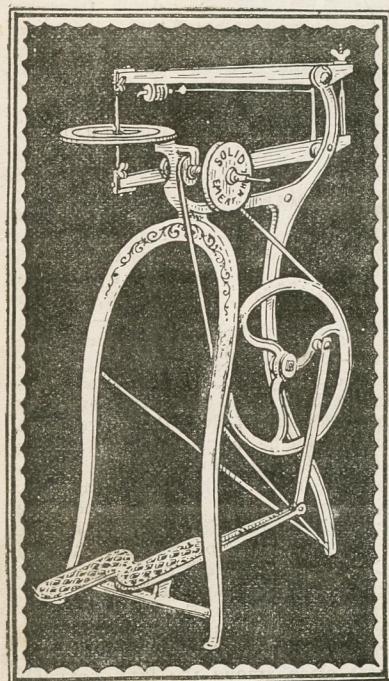
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